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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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Siu-Kei Tin

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EXAMINER

GE, YUZHEN

ART UNIT

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/840,089	Applicant(s) TIN, SIU-KEI	
	Examiner YUZHEN GE	Art Unit 2624	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 11 June 2009.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,4-12,15-23 and 26-33 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1, 4-5, 9-12, 15-16, 20-23, 26-27, and 31-33 is/are rejected.
- 7) ☒ Claim(s) 6-8,17-19 and 28-30 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 6/11/2009 has been entered.

Examiner's Remark

Applicant's amendment, filed on 6/11/2009 has been received and entered into the file. The 112 2nd paragraph rejection of claim 1, 4-12, 15-23 and 26-33 have been overcome in view of applicant's amendments/remarks and are hereby withdrawn. Claims 1, 4-12, 15-23 and 26-33 are pending.

Regarding applicant's argument that the processing disclosed in Fig. 6 of Lin is only for mapping a color value outside of a device gamut into the device gamut and Lin does not describe using the human visual gamut which is different from the device gamut (second paragraph of Page 14 of the REMARKS), the examiner would like to point out that a device gamut includes all the color that can be produced/reproduced by the device that is inside a human gamut (see Section II of the paper "Color Device Calibration: A Mathematical formulation" by Vrhel et al, sent with the previous office action). Therefore a device gamut is inside a human visual gamut. Furthermore a human visual gamut is just a subspace in the color space, similar to the device gamut disclosed by Lin et al. Clipping colors outside of a subspace of a color space is well known and it is disclosed by Lin et al as described in the rejection below. Therefore the 103 rejection of claim 1 has not been overcome.

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Upon further consideration, the examiner indicates that claims 6-8, 17-19 and 28-30 are allowable.

Applicant's other arguments with respect to the pending claims have been considered but are moot in view of the new ground(s) of rejection.

DETAILED ACTION

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1, 4-5, 9-12, 15-16, 20-23, 26-27, and 31-33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lin et al (US Patent 6,181,445) in view of Hardeberg (US Patent 6,728,401) further in view of Ben-David et al (US Patent Pub. 2004/0174389)

Regarding claim 1, Lin et al teach a method of transforming device-dependent color values in a device-dependent color space (RGB col. 9, lines 5-10) of a color input device to device-independent color values inside a human visual gamut in a device-independent color space (XYZ or L*a*b*, col. 7, lines 25-36, col. 9, lines 5-10), comprising the steps of;

providing a mathematical model for converting device-dependent color values in a device-dependent color space of the color input device to device-independent color values in the device-independent color space (col. 7, lines 33-36, col. 9, lines 5-10)

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converting an input device-dependent color value (RGB values col. 7, lines 25-36) in the device-dependent color space generated by the color input device into a device-independent color value (XYZ value, col. 7, lines 25-36 or $L^*a^*b^*$ value, col. 9, lines 5-10) in the device-independent color space (XYZ color space or CIE $L^*a^*b^*$ space, col. 7, lines 25-27 and lines 65-67) using the mathematical model of the color input device (col. 7, lines 19-36, the inverse function convert from device dependent color values to a device-independent color value, col. 8, lines 4-21);

determining whether or not the device-independent color value is outside the human visual gamut in the device-independent color space (Figs. 6A-6B, the gamut 133 is a human visual gamut, see also Fig. 4, col. 9, lines 57-65, col. 15, lines 46-61); and

when it is determined that the device-independent color value is outside the human visual gamut, clipping the device-independent color value to another device-independent color value in the device independent color space on the boundary of the human visual gamut (point 142 for point 141 and point 145 for point 144 in Fig. 6B, col. 11, lines 48-52, Figs. 6A-6B, point 144 is clipped to 145, point 141 to 142, col. 15, lines 46-61).

However they do not explicitly teach

determining whether or not a device-independent color value has a luminance component less than zero;

when it is determined that the luminance component is less than zero, performing the following steps:

clipping the luminance component to zero.

In the same field of endeavor, Hardeberg teaches

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determining whether or not a device-independent color value has a luminance component less than zero (col. 9, lines 27-31);

when it is determined that the luminance component is less than zero, performing the following:

clipping the luminance component to zero (col. 9, lines 27-31).

Also in the same field of endeavor, Ben-David et al teach setting the chromaticity components of the device-independent color value to zero (paragraph [0091]).

By the definition of luminance, it should be greater than or equal to 0. In other words, a valid value for the luminance value for a pixel of an image should be greater than 0. It may be small than 0 only when mathematical derivation and approximation are used. Also when the luminance component is 0, the chromaticity values are not meaningful. It is desirable to have the luminance values that correspond to real pixel values and correct any error made during mathematical manipulations and estimations (col. 9, lines 5-31 of Hardeberg). Therefore it would have been obvious to one of ordinary skill in the art, at the time of invention, to determine whether a luminance component is negative and clip the luminance component and chromaticity values to zero so that the color values are meaningful.

Regarding claim 4, Lin et al, Hardeberg and Ben-David et al teach the method according to claim 2. Lin et al further teach wherein the luminance component of the device-independent color value is not clipped at an upper bound in the clipping (col. 16, lines 8-31, the white point is specified by the threshold and the luminance is allowed to exceed the threshold value, Fig. 6B, point 141 to point 142, col. 15, lines 46-61, e.g. luminance levels from 0 to 40 are clipped to 30-

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40, while those from 40-100 are unchanged) wherein the luminance components of the device-independent color value is allowed to take a value higher than a diffuse white point of the device-independent color space (col. 16, lines 8-23, luminance values are allowed to be higher than 95, which is regarded as the diffuse white point).

Regarding claim 5, Lin et al, Hardeberg and Ben-David et al teach the method of claim 1. Lin et al further teach wherein the clipping the device-independent color value further comprises mapping the device independent color value outside the human visual gamut to an intersection between a line defined by the device-independent color value and a white point and the boundary of the human visual gamut (the point on L^* axis is the white point, Fig. 6A, the point 135 is the result of mapping, 134 is the device-independent color value outside the human visual gamut).

Regarding claim 9, Lin et al, Hardeberg and Ben-David et al teach the method of claim 1. Lin et al further teach wherein the device independent color space is CIE XYZ (col. 7, lines 25-36, Figs. 3A and 13A).

Regarding claim 10, Lin et al, Hardeberg and Ben-David et al teach the method of claim 1. Hardeberg further teaches wherein the device independent color space is CIELUV (col. 6, lines 34-44). Using a perceptually linear color space is advantageous because it is uniform according to human visual system (col. 6, lines 31-39 of Hardeberg). Therefore it would have been obvious to one of ordinary skill in the art, at the time of invention, to use a CIE LUV color space so that the color space is perceptually uniform according to human visual system.

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Regarding claim 11, Lin et al and Hardeberg and Ben-David et al teach the method of claim 1.

Lin et al further teach wherein the device independent color space is CIELAB (Figs. 3B, 5A-8, col. 10, lines 19-49, col. 11, lines 39-53).

Claims 12, 15-16, 20-22 and 23, 26-27, 31-33 are the corresponding system and computer readable medium claims of claims 1, 4-5 and 9-11. All the limitations of computer readable medium claim 27 are in the corresponding method claims of claim 5. Lin et al teach a system (Figs. 1 and 12, col. 5, lines 17-28) and a computer readable medium (col. 6, lines 21-41, Fig. 12). Thus Lin et al and Hardeberg and Ben-David et al teach claims 12, 15-16, 20-23, 26-27 and 31-33 as evidently explained in the above-cited passages.

Allowable Subject Matter

4. Claims 6-8, 17-19 and 28-30 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter. The prior art fails to teach the listed claims each of which specifically comprises the following listed feature(s) in combination with other limitations in the respective claims:

- the boundary of the human visual gamut is the ISO standard CIE spectral locus on a chromaticity space.

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Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to YUZHEN GE whose telephone number is (571)272-7636. The examiner can normally be reached on 7:30am-4:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Matthew Bella can be reached on 571-272-7778. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Yuzhen Ge/
Examiner, Art Unit 2624